UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,508	09/26/2006	Daniel Kopf	117891	9426

25944 7590 07/17/2008

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
ZHANG, YUANDA	

ART UNIT	PAPER NUMBER
2828	

MAIL DATE	DELIVERY MODE
07/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,508	KOPF ET AL.	
	Examiner	Art Unit	
	YUANDA ZHANG	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/21/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to because of the following informalities: word "reflection" should be changed to "reflections". Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In re claim 1, the limitation of "the pulse stretcher having a minimum of 3rd order dispersion with a maximum of 2nd order dispersion" is not reasonably conveyed in view of the specification. The specification suggests that a SF57 glass or a SF10 glass, given as an example, is used as a pulse stretcher. In paragraph [0023], the specification then discloses that "An advantageous ratio of the 2.sup.nd order (positive) dispersion to the 3.sup.rd order (positive) dispersion should be achieved, i.e. a minimum 3.sup.rd order dispersion in combination with maximum 2.sup.nd order dispersion." The claim language suggests that a pulse stretcher as "a specially designed component". However, not given enough disclosure in the specification, one cannot determine what special design is implemented in order to

achieve a minimum of 3rd order dispersion with a maximum of 2nd order dispersion. Therefore, the Examiner has reasonably concluded based on the lack of disclosure in the specification that a SF57 glass or a SF10 glass has an inherent property of a minimum of 3rd order dispersion with a maximum of 2nd order dispersion.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 17 recites the limitations "the relationship" in line 1 and "the Treacy design". There is insufficient antecedent basis for this limitation in the claim. The Examiner believes that "the relationship" should be replaced with "a relationship" and "the Treacy design" should be replaced with "Treacy design".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-4, 6-9, 11-12, 14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over T.B. Norris ("Femtosecond pulse amplification at 250 kHz with a Ti:sapphire regenerative amplifier and application to continuum generatino" Optical Society of America 2412 Optics Letters 17(1992) July 15, No. 14) in view of M.

Hentschel et al (Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000).

8. In re claim 1, T.B. Norris discloses laser system having a repetition rate greater than 50 KHz (a repetition rate of 76 MHz) according to the principle of the regenerative amplifier (Ti: sapphire regenerative amplifier), comprising at least an amplifying laser medium (Ti: sapphire laser medium), a laser resonator (Ti: sapphire oscillator regenerative amplifier shown in figure 2) having at least one resonator mirror (mirror next to the Q-switch) and at least one modulator (Q-switch), and a pump source (cw argon pump source) for pumping the laser medium (see figure 1).

9. T.B. Norris does not disclose wherein the laser resonator has a pulse stretcher as a specially designed component having a structure- and/or material-related dispersive effect, the pulse stretcher having minimum 3rd order dispersion with maximum 2nd order dispersion.

10. However, with reference to figure 3, M. Hentschel et al disclose a pulse stretcher which includes a SF57 glass (page S162, first paragraph under 2 Setup) having a minimum 3rd order dispersion with a maximum 2nd order dispersion (According to the 112 rejection above, the pulse stretcher as SF57 has an inherent material property of having a minimum 3rd order dispersion with a maximum 2nd order dispersion).

11. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the laser system of T.B. Norris with a pulse stretcher having a material property of a minimum of 3rd order dispersion with a maximum of 2nd order dispersion as taught by M. Hentschel et al in order to obtain high

efficiency pulse stretching without introducing any alignment issue (page S162, first paragraph under 2 Setup).

12. In re claim 2, M. Hentschel et al disclose wherein the pulse stretcher has a block of highly dispersive material (inherent property of SF57).

13. In re claim 3, M. Hentschel et al disclose multiple reflections takes place within the block (inherent for SF57).

14. In re claims 4 and 16, M. Hentschel et al disclose a dispersive layer which is a used as a folding mirror (pulse stretcher includes a plurality of folding mirror, see figure 3).

15. In re claim 6, T.B. Norris / M. Hentschel et al have disclosed the claimed invention above except wherein the laser medium has an inversion life (storage time) greater than 1 ms. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a laser medium having an inversion life of greater than 1 ms in order to obtain a higher output power, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin,* 125 USPQ 416.

16. In re claim 7, T.B. Norris discloses wherein a femtosecond oscillator for inputting seed pulses, the femtosecond oscillator being formed and arranged in such a way that the seed pulses are femtosecond pulses or picosecond pulses on input into the laser resonator (second paragraph, page 1009).

17. In re claim 8, T.B. Norris discloses wherein an electro-optical switching element as modulator (Q-switch) (see figure 2).

18. In re claim 9, T.B. Norris discloses wherein a pulse compressor (compressor consists of a plurality of SF10 prism) is outside the laser resonator (see figure 1).

19. In re claim 11, M. Hentschel et al disclose wherein the pump source is a laser diode (diode pumped Nd: YVO4, see figure 3).

20. In re claim 12, M. Hentschel et al disclose wherein the highly dispersive material is SF57 glass block (page S162, first paragraph under 2 Setup).

21. In re claim 14, T.B. Norris / M. Hentschel et al have disclosed the claimed invention above except wherein the laser medium is a Yb:glass or Yb:crystal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a laser medium of Yb:glass or Yb:crystal in order to obtain a longer inversion time which increase output power (see applicant admitted prior art "Directly diode-pumped Yb:KY(WO4)2 regenerative amplifier"), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin,* 125 USPQ 416.

22. In re claim 17, T.B. Norris disclose a relationship of the pulse compressor outside the laser resonator is according to Treacy design (inherent, based on the claim language, the Examiner notes that Treacy design is satisfied if the pulse compressor is placed outside of the laser resonator).

23. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over T.B. Norris ("Femtosecond pulse amplification at 250 kHz with a Ti:sapphire regenerative amplifier and application to continuum generatino" Optical Society of America 2412 Optics Letters 17(1992) July 15, No. 14) in view of M. Hentschel et al ("Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000) as applied to claim 1 above, and further in view of Pang (US PG Pub 2003/0095320 A1).

24. In re claim 5, T.B. Norris / M. Hentschel et al have disclosed the claimed invention above except wherein the pulse stretcher has at least two reflecting surfaces, the surfaces being arranged in such a way that the surfaces are oriented - relative to one another and - at an opening angle, and the laser beam is reflected at least twice at at least one of the surfaces. However, with reference to figure 2, Pang discloses a pulse stretcher (50) has at least two reflecting surfaces (70 & 72), the surfaces being arranged in such a way that the surfaces are oriented - relative to one another (facing each other) and - at an opening angle (angle **e**), and the laser beam is reflected at least twice at at least one of the surfaces (paragraph [0028]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the laser system of T.B. Norris / M. Hentschel et al with an alternative pulse stretcher as taught by Pang in order to obtain a tunable pulse stretcher.

25. In re claim 13, Pang discloses wherein the opening angle is adjustable (grating 70 is tunable by adjusting its angle, see figure 2).

26. Claims 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over T.B. Norris ("Femtosecond pulse amplification at 250 kHz with a Ti:sapphire regenerative amplifier and application to continuum generation" Optical Society of America 2412 Optics Letters 17(1992) July 15, No. 14) in view of M. Hentschel et al (Generation of 0.1-TW optical pulses with a single-stage Ti:sapphire amplifier at a 1-kHz repetition rate" Appl. Phys. B 70 [Suppl.], S161-S164 2000) as applied to claim 1 above, and further in view of H. Takada et al ("Large-ratio stretch and recompression of sub-10-fs pulses utilizing dispersion managed devices and a spatial light modulator", Appl. Phys. B 74 [Suppl.], S253-S257 2002).

27. In re claims 10 and 15, T.B. Norris / M. Hentschel et al have disclosed the claimed invention above except wherein the pulse compressor has s dispersive grating having less than 1200 lines/mm. However, with reference to figure 6, H. Takada et al disclose a dispersion compressor includes a pair of dispersive grating with 200 lines/mm for compressing pulses. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a pulse compressor with a pair of dispersive grating of less than 1200 lines/mm to compress pulses since it is a known alternative to a pulse compressor comprising a plurality of prism.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUANDA ZHANG whose telephone number is

(571)270-1439. The examiner can normally be reached on Monday-Thursday, 7:30am-6:00p EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/YZ/
07/11/08

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828